

# Cyanobacteria as Biocatalysts for Solar-driven Biofuel Production

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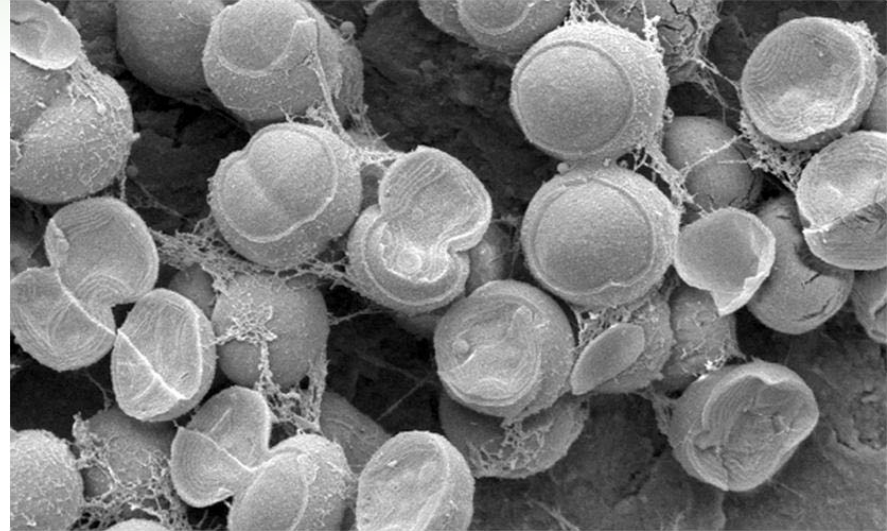
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# Cyanobacterial Platform for Solar Biofuel Production



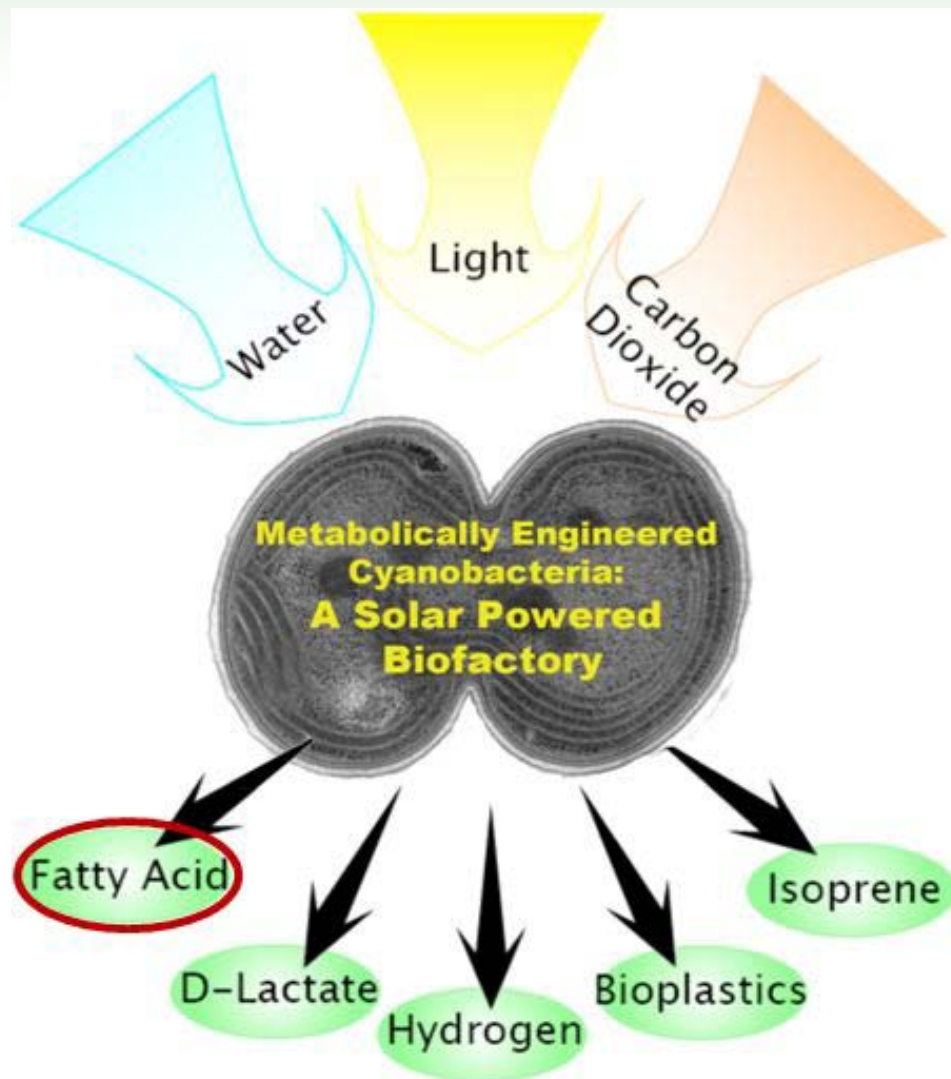
**Efficiency <1%**



**Efficiency ~4%**

- Switchable to stationary phase:
  - no net biomass generation
  - no net mineral use
- Secreted fatty acid, easy separation
- Few biochemical steps
- Can use atmospheric CO<sub>2</sub>

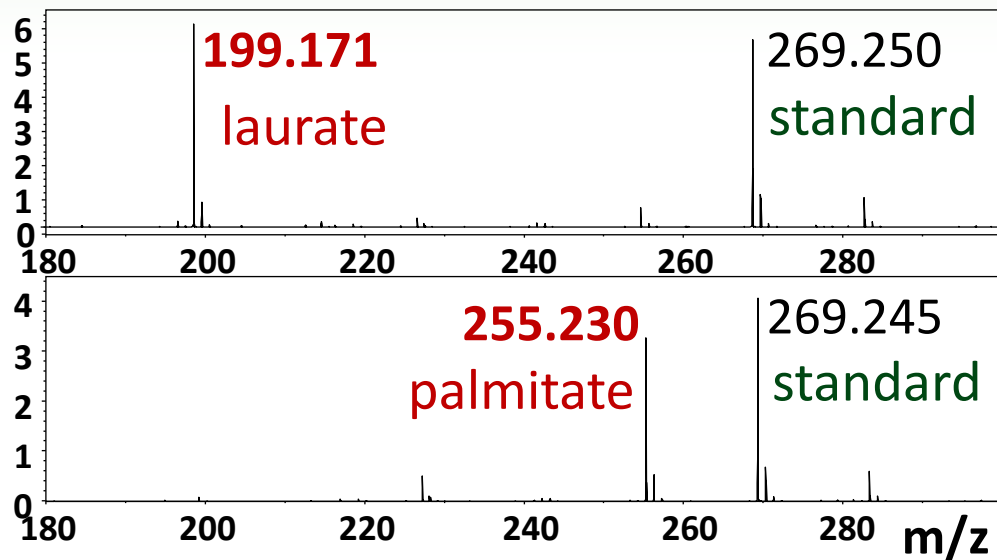
# *Synechocystis* as a Biocatalyst



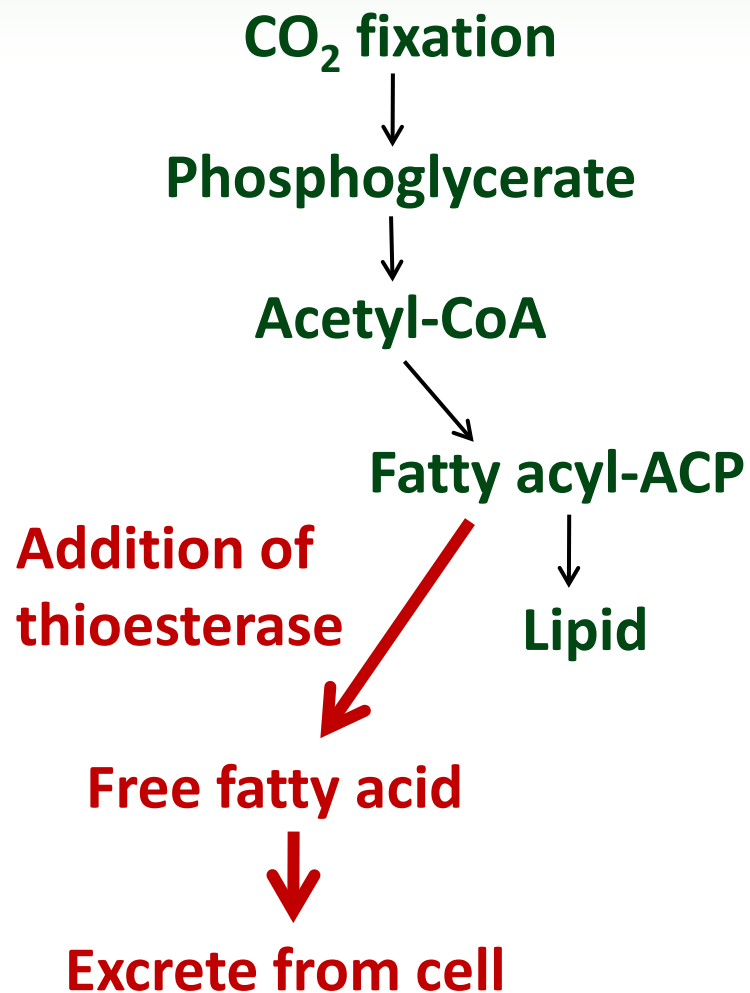
## Visible Light Energy Conversion Efficiency

- Currently: 3%, \$10/gal
- Long-term goal: 10%, \$3/gal
- Theoretical max: 21%

# Producing Secreted Fatty Acids from Light and CO<sub>2</sub>



**“Dial in”  
desired product  
with specific  
thioesterase**





# Excellent Fatty Acid Recovery

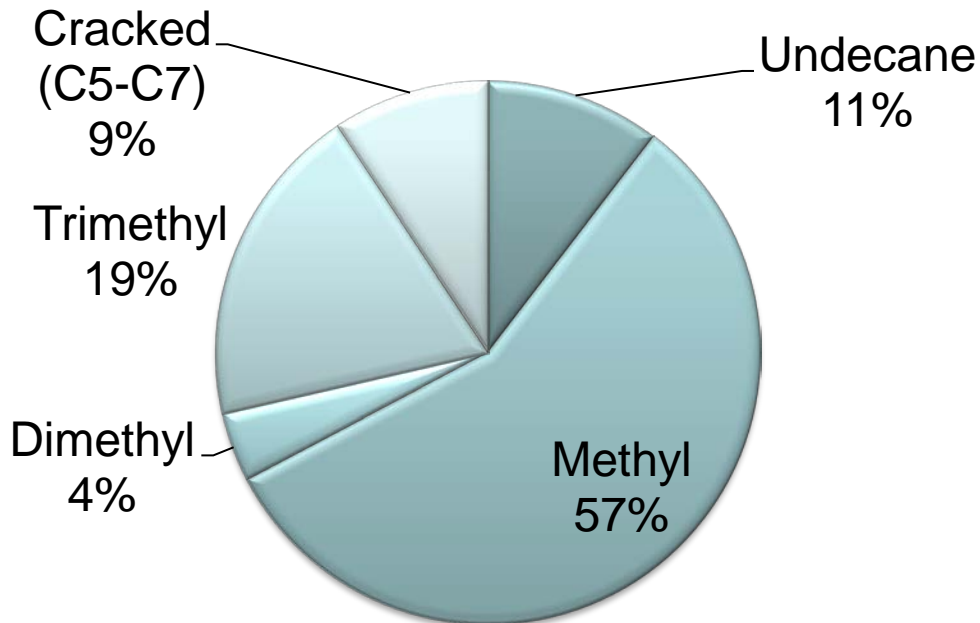


Expanded-bed columns of reusable resin

# Decarboxylation and Isomerization

**Fatty acid conversion to alkane** (at high temperature and pressure, and with a catalyst for decarboxylation and isomerization)

## Production Yield



## Properties

Freeze Point*	-35 °C
Flash Point	37 °C
Mass Conversion	83%

\*As low as we can test

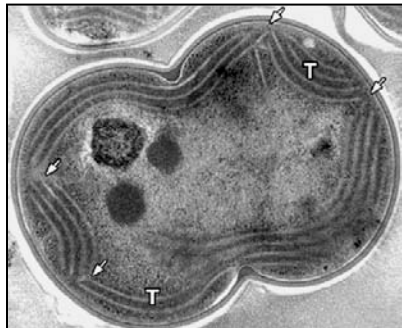


# Scale-up Scenario





# The Team



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